Official blog of the Met Office news team

Climate study backs up Met Office research

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A study published today [Friday 29 July] by World Weather Attribution supports a previous Met Office study that was published before this summer and which looked at the prospect of 40°C in the UK.

The UK's temperature record was broken on 19 July 2022 when 40.3C was recorded at Coningsby in Lincolnshire. Picture: Shutterstock

The Met Office study found that the likelihood of seeing 40°C in the UK has been rapidly increasing and what would once have been an extremely unlikely event without climate change has now become a distinct possibility. Both the Met Office and WWA studies found that human-caused climate change has made the chance of 40°C in the UK about ten times more likely when compared with the pre-industrial climate. Taken together, the Met Office research carried out ahead of this summer's heatwave and the WWA study conducted shortly afterwards, this research underscores the importance of needing to adapt to such extreme temperatures.

While current calculations indicate that the chance of 40°C temperatures occurring in the UK is around a 1% chance every year, Met Office research shows that this could increase with further greenhouse gas emissions. In the most extreme emissions case considered this could reach around 33% chance every year but current international efforts to reduce greenhouse gas emissions may reduce this to 5-6% in any given year. Further emission reductions inline with the Paris agreement (CoP26) climate temperature goals could reduce the yearly chance further.

The Met Office study was published in 2020 in a paper by Nikos Christidis, Mark McCarthy and Peter Stott in Nature Communications. At the time, Nikos Christidis said: "Our paper shows that the likelihood of hitting 40°C is rapidly increasing. In a 'natural' climate without human-caused climate change, the event would have been exceptionally rare."

It is clear that temperature extremes of 40°C or more have been unlikely in the historic climate and are still unlikely today. Different studies show some variation but all agree that events of this magnitude are unlikely in the current UK climate but that the chances are growing all the time

Professor Jason Lowe OBE said: "The potential for a temperature of 40°C or more for the UK's current climate is captured within computer models and the output from the UK Climate Projections (UKCP18)."

It is not inconceivable that we could get another forecast of 40°C for the UK later this summer. Professor Peter Stott – a globally recognised authority on heatwaves, added: "The heat which brought these record-breaking temperatures to our shores is still in place in south western Europe, prompting the risk of further extremely hot temperatures."

The heatwave in the UK fits into a global pattern of weather this summer. As well as the exceptionally high temperatures in Western Europe, China has endured three heatwaves so far this summer and the US has experienced exceptionally high temperatures, particularly in the South-West. This is part of a naturally-occurring wave-like pattern in the atmosphere around the Northern Hemisphere. When combined with a warming climate and localised effects that can enhance the heat even further, the result is a widespread pattern of heatwaves across the planet.

Peter Stott concuded: "These searing temperatures across the globe, not just this year but in the last few years, show how temperature records are not just being broken but are being shattered. The climate science community remains focussed on establishing where these events fit into our climate modelling and predictions, and continuing research to enhance our understanding of how these elements come together as the climate continues to change."

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